



5016 Replacement CRF 23 Feb 2004  
SEQUENCE LISTING

<110> Saxena, Shailendra K.

<120> RIBONUCLEASES AND METHODS OF MAKING THEM RECOMBINANTLY

<130> 5016 US

<140> US 10/621,741

<141> 2003-07-17

<160> 74

<170> PatentIn version 3.1

<210> 1

<211> 114

<212> PRT

<213> Rana pipiens

<400> 1

Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His Ile  
1 5 10 15

Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn Asp  
20 25 30

Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe Ile  
35 40 45

His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr Gly  
50 55 60

Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Thr Leu Thr Thr Cys Lys  
65 70 75 80

Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe Ile  
85 90 95

Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr Gly  
100 105 110

Lys Cys

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<211> 342

<212> DNA

<213> Rana pipiens

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gttgctgact tcaactgcaa ccgtactatg aacgaccggg cttacactcc ggacggtcag 120

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tgcaaaccga tcaacacitt catccattct actactggtc cggttaaaga aatctgccgt	180
cgtgctactg gtcgtgttaa caaatcttct actcagcagt tcactctgac tacttgcaaa	240
aaccgatcc gttgcaaata ctctcagtct aacactacta acttcatctg catcacttgc	300
cgtgacaact acccggttca tttcgttaaa actggtaa at gc	342

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tta	63

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<400> 5	
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<210> 6  
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acggttgacg ttgaagtcag caacagactg agaagtgata tgtttagttt tgaattt	57

<210> 7  
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 <212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence

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<210> 8

<211> 60

<212> DNA

<213> Artificial

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<400> 8

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<210> 9

<211> 52

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<210> 10

<211> 52

<212> DNA

<213> Artificial

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<223> Artificially synthesized sequence complimentary to SEQ ID NO:9

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cacgaccagt agcacgacgg cagatttctt taaccggacc agtagtagaa tg 52

<210> 11

<211> 54

<212> DNA

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<211> 54

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<210> 13  
<211> 57  
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<400> 13  
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<400> 15  
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<210> 16  
<211> 53  
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<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:15

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<210> 17  
<211> 114  
<212> PRT  
<213> Rana pipiens

<400> 17

Lys Pro Lys Glu Asp Lys Glu Trp Glu Lys Phe Lys Val Lys His Ile  
1 5 10 15

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Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Thr Ser Thr Met Asn Asn  
20 25 30

Pro Asp Phe Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe Ile  
35 40 45

His Ser Asn Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Ser Gly  
50 55 60

Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Pro Leu Thr Thr Cys Lys  
65 70 75 80

Asn Pro Lys Arg Cys Lys Tyr Ser Gln Ser Asn Glu Thr Asn Tyr Ile  
85 90 95

Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Ile Gly  
100 105 110

Lys Cys

<210> 18  
<211> 342  
<212> DNA  
<213> Rana pipiens

<400> 18  
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gttgctgact tcaactgcac ttctactatg aacaaccgga acttcactcc ggacgggtcag 120  
tgcaaaccga tcaacacttt catccattct aacactgggc cggttaaaga aatctgccgt 180  
cgtgcttctg gtcgtgttaa caaatcttct actcagcagt tcccgtgac tacttgcaaa 240  
aaccgaaac gttgcaaata ctctcagtct aacgaaacta actacatctg catcacttgc 300  
cgtgacaact acccggttca tttcgttaaa atcggtaaat gc 342

<210> 19  
<211> 56  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 19  
taattttgtt taactttaag aaggagatat accatgaaac cgaaagaaga caaaga 56

<210> 20  
<211> 63

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<212> DNA  
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<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:19

<400> 20  
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tta 63

<210> 21  
<211> 57  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 21  
atgggaaaaa ttcaaagtta aacatatcac ttctcagtct gttgctgact tcaactg 57

<210> 22  
<211> 57  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:21

<400> 22  
agaagtgcag ttgaagtcag caacagactg agaagtgata tgtttaactt tgaattt 57

<210> 23  
<211> 60  
<212> DNA  
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<220>  
<223> Artificially synthesized sequence

<400> 23  
cacttctact atgaacaacc cggacttcac tccggacggt cagtgcacaaac cgatcaaacac 60

<210> 24  
<211> 60  
<212> DNA  
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<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:23

<400> 24  
gatgaaagtg ttgatcggtt tgcactgacc gtccggagtg aagtcggggt tgttcatagt 60

<210> 25  
<211> 52  
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<220>

<223> Artificially synthesized sequence

<400> 25

tttcatccat tctaactctg gtccggttaa agaaatctgc cgtcgtgctt ct

52

<210> 26

<211> 52

<212> DNA

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<223> Artificially synthesized sequence complimentary to SEQ ID NO:25

<400> 26

cacgaccaga agcacgacgg cagatttctt taaccggacc agtgtagaa tg

52

<210> 27

<211> 54

<212> DNA

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<223> Artificially synthesized sequence

<400> 27

ggtcgtgtta acaaattctt tactcagcag ttcccgctga ctacttgcaa aaac

54

<210> 28

<211> 54

<212> DNA

<213> Artificial

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<223> Artificially synthesized sequence compliment to SEQ ID NO:27

<400> 28

gtttcgggtt ttgcaagta gtcagcggga actgctgagt agaagatttg ttaa

54

<210> 29

<211> 57

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence

<400> 29

ccgaaacgtt gcaaatactc tcagtctaac gaaactaact acatctgcat cacttgc

57

<210> 30

<211> 57

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence compliment to SEQ ID NO:29

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tgtcacggca agtgatgcag atgtagttag tttcgttaga ctgagagtat ttgcaac 57

<210> 31  
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<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 31  
cgtgacaact acccggttca tttcgttaaa atcggtaaat gctagtaggg atccgcgcgg 60

<210> 32  
<211> 53  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:31

<400> 32  
ccgcgcggat ccctactagc atttaccgat tttaacgaaa tgaaccgggt agt 53

<210> 33  
<211> 43  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Artificially synthesized sequence

<400> 33  
caattcccct ctagaaataa ttttgtttaa cttaagaag gag 43

<210> 34  
<211> 114  
<212> PRT  
<213> Rana pipiens

<400> 34

Lys Pro Lys Glu Asp Lys Glu Trp Val Lys Phe Lys Ala Lys His Ile  
1 5 10 15

Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Lys Thr Met Asn Asp  
20 25 30

Pro Asp Phe Thr Pro Asp Gly Gln Cys Lys Pro Val Asn Thr Phe Ile  
35 40 45

His Ser Asn Thr Gly Pro Val Lys Asp Ile Cys Arg Arg Ala Ser Gly  
50 55 60



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Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Pro Leu Thr Thr Cys Asn  
65 70 75 80

Lys Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe Ile  
85 90 95

Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Ile Gly  
100 105 110

Lys Cys

<210> 35  
<211> 342  
<212> DNA  
<213> Rana pipiens

<400> 35  
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gttgctgact tcaactgcaa caaaactatg aacgaccgga acttcactcc ggacgggtcag 120  
tgcaaaccgg ttaacacttt catccattct aacactgggc cggttaaaga catctgccgt 180  
cgtgcttctg gtcgtgttaa caaatcttct actcagcagt tcccgctgac tacttgcaac 240  
aaaccgatcc gttgcaaata ctctcagtct aacactacta acttcacttg catcacttgc 300  
cgtgacaact acccggttca tttcggttaa atcggtaaat gc 342

<210> 36  
<211> 56  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 36  
aattttgttt aactttaaga aggagatata catatgaaac cgaaagaaga caaaga 56

<210> 37  
<211> 56  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:36

<400> 37  
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<210> 38  
<211> 56

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<212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence

<400> 38  
 atggggttaaa ttcaaagcta aacatatcac ttctcagtct gttgctgact tcaact 56

<210> 39  
 <211> 56  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence complimentary to SEQ ID NO:38

<400> 39  
 ttgtttgcagt tgaagtcagc aacagactga gaagtgatat gtttagcttt gaattt 56

<210> 40  
 <211> 59  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence

<400> 40  
 gcaacaaaac tatgaacgac ccggacttca ctccggacgg tcagtgcaaa ccggttaac 59

<210> 41  
 <211> 59  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence complimentary to SEQ ID NO:40

<400> 41  
 tgaaagtgtt aaccggtttg cactgaccgt ccggagtga gtcggggtcg ttcatagtt 59

<210> 42  
 <211> 54  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence

<400> 42  
 actttcatcc attctaacac tgggtccggtt aaagacatct gccgtcgtgc ttct 54

<210> 43  
 <211> 54  
 <212> DNA  
 <213> Artificial

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<220>

<223> Artificially synthesized sequence complimentary to SEQ ID NO:42

<400> 43

cacgaccaga agcagcagcg cagatgtctt taaccggacc agtgttagaa tgga 54

<210> 44

<211> 54

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence

<400> 44

ggtcgtgtta acaaattctt tactcagcag ttcccgtga ctacttgcaa caaa 54

<210> 45

<211> 54

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence complimentary to SEQ ID NO:44

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<210> 46

<211> 57

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence

<400> 46

ccgatccgtt gcaaatactc tcagtctaac actactaact tcattctgcat cacttgc 57

<210> 47

<211> 57

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence complimentary to SEQ ID NO:46

<400> 47

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<210> 48

<211> 54

<212> DNA

<213> Artificial

<220>

<223> Artificially synthesized sequence

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<400> 48  
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<210> 49  
<211> 53  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence complimentary to SEQ ID NO:48

<400> 49  
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<210> 50  
<211> 42  
<212> DNA  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 50  
gcccagccgg cgatggccaa accgaaagaa gaccgtgaat gg 42

<210> 51  
<211> 114  
<212> PRT  
<213> Rana pipiens

<400> 51

Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His Ile  
1 5 10 15

Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn Asp  
20 25 30

Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Val Asn Thr Phe Ile  
35 40 45

His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr Gly  
50 55 60

Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Thr Leu Thr Thr Cys Lys  
65 70 75 80

Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe Ile  
85 90 95

Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr Gly  
100 105 110

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Lys Cys

<210> 52  
 <211> 342  
 <212> DNA  
 <213> Rana pipiens

<400> 52  
 aaaccgaaag aagaccgtga atgggaaaaa ttcaaaacta aacatatcac ttctcagtct 60  
 gttgctgact tcaactgcaa ccgtactatg aacgaccggg cttacactcc ggacgggtcag 120  
 tgcaaaccgg ttaacacttt catccattct actactgggc cggttaaaga aatctgccgt 180  
 cgtgctactg gtcgtgttaa caaatcttct actcagcagt tcactctgac tacttgcaaa 240  
 aaccgatcc gttgcaaata ctctcagtct aacactacta acttcatctg catcacttgc 300  
 cgtgacaact acccggttca tttcgttaaa actggtaa at gc 342

<210> 53  
 <211> 39  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence

<400> 53  
 gacggtcagt gcaaaccggt taacactttc atccattct 39

<210> 54  
 <211> 39  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Artificially synthesized sequence complementary to SEQ ID NO:53

<400> 54  
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<210> 55  
 <211> 114  
 <212> PRT  
 <213> Rana pipiens

<400> 55

Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His Ile  
 1 5 10 15

Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn Asp  
 20 25 30

Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe Ile  
 Page 13

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His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr Gly  
50 55 60

Arg Val Asn Lys Ser Ser Cys Gln Gln Phe Thr Leu Thr Thr Cys Lys  
65 70 75 80

Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe Ile  
85 90 95

Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr Gly  
100 105 110

Lys Cys

<210> 56  
<211> 342  
<212> DNA  
<213> Rana pipiens

<400> 56  
aaaccgaaag aagaccgtga atgggaaaaa ttcaaaacta aacatatcac ttctcagtct 60  
gttgctgact tcaactgcaa ccgtactatg aacgaccgg cttacactcc ggacggtcag 120  
tgcaaaccga tcaacacttt catccattct actactggtc cggttaaaga aatctgccgt 180  
cgtgctactg gtcgtgttaa caaatcttct tgccagcagt tcaacttgac tacttgcaaa 240  
aaccgatcc gttgcaaata ctctcagtct aacactacta acttcatctg catcacttgc 300  
cgtgacaact acccggttca tttcgttaaa actggtaa at gc 342

<210> 57  
<211> 39  
<212> DNA  
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<220>  
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<400> 57  
gttaacaaat cttcttgcca gcagttcact ctgactact 39

<210> 58  
<211> 39  
<212> DNA  
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<220>  
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<400> 58

cagagtgaac tgctggcaag aagatttggt aacacgacc

39

<210> 59  
 <211> 115  
 <212> PRT  
 <213> Rana pipiens

<400> 59

Met Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His  
 1 5 10 15

Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn  
 20 25 30

Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe  
 35 40 45

Ile His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr  
 50 55 60

Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Thr Leu Thr Thr Cys  
 65 70 75 80

Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe  
 85 90 95

Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr  
 100 105 110

Gly Lys Cys  
 115

<210> 60  
 <211> 115  
 <212> PRT  
 <213> Rana pipiens

<400> 60

Met Lys Pro Lys Glu Asp Lys Glu Trp Glu Lys Phe Lys Val Lys His  
 1 5 10 15

Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Thr Ser Thr Met Asn  
 20 25 30

Asn Pro Asp Phe Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe  
 35 40 45

Ile His Ser Asn Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Ser  
 50 55 60

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Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Pro Leu Thr Thr Cys  
65 70 75 80

Lys Asn Pro Lys Arg Cys Lys Tyr Ser Gln Ser Asn Glu Thr Asn Tyr  
85 90 95

Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Ile  
100 105 110

Gly Lys Cys  
115

<210> 61  
<211> 115  
<212> PRT  
<213> Rana pipiens

<400> 61

Met Lys Pro Lys Glu Asp Lys Glu Trp Val Lys Phe Lys Ala Lys His  
1 5 10 15

Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Lys Thr Met Asn  
20 25 30

Asp Pro Asp Phe Thr Pro Asp Gly Gln Cys Lys Pro Val Asn Thr Phe  
35 40 45

Ile His Ser Asn Thr Gly Pro Val Lys Asp Ile Cys Arg Arg Ala Ser  
50 55 60

Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Pro Leu Thr Thr Cys  
65 70 75 80

Asn Lys Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe  
85 90 95

Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Ile  
100 105 110

Gly Lys Cys  
115

<210> 62  
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<213> Artificial

<220>



<223> Artificially synthesized sequence

<400> 62

Met Ala  
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<210> 63

<211> 116

<212> PRT

<213> Rana pipiens

<400> 63

Met Ala Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys  
1 5 10 15

His Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met  
20 25 30

Asn Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr  
35 40 45

Phe Ile His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala  
50 55 60

Thr Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Thr Leu Thr Thr  
65 70 75 80

Cys Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn  
85 90 95

Phe Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys  
100 105 110

Thr Gly Lys Cys  
115

<210> 64

<211> 7

<212> PRT

<213> Artificial

<220>

<223> Artificially synthesized sequence

<400> 64

Ala Ala Gln Pro Ala Met Ala  
1 5

<210> 65

<211> 121

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<212> PRT  
<213> Rana pipiens

<400> 65

Ala Ala Gln Pro Ala Met Ala Lys Pro Lys Glu Asp Arg Glu Trp Glu  
1 5 10 15

Lys Phe Lys Thr Lys His Ile Thr Ser Gln Ser Val Ala Asp Phe Asn  
20 25 30

Cys Asn Arg Thr Met Asn Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys  
35 40 45

Lys Pro Ile Asn Thr Phe Ile His Ser Thr Thr Gly Pro Val Lys Glu  
50 55 60

Ile Cys Arg Arg Ala Thr Gly Arg Val Asn Lys Ser Ser Thr Gln Gln  
65 70 75 80

Phe Thr Leu Thr Thr Cys Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln  
85 90 95

Ser Asn Thr Thr Asn Phe Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro  
100 105 110

Val His Phe Val Lys Thr Gly Lys Cys  
115 120

<210> 66  
<211> 22  
<212> PRT  
<213> Artificial

<220>  
<223> Artificially synthesized sequence

<400> 66

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
1 5 10 15

Ala Gln Pro Ala Met Ala  
20

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<211> 136  
<212> PRT  
<213> Rana pipiens

<400> 67

Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala  
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1                      5                      10                      15

Ala Gln Pro Ala Met Ala Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys  
20                      25                      30

Phe Lys Thr Lys His Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys  
35                      40                      45

Asn Arg Thr Met Asn Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys  
50                      55                      60

Pro Ile Asn Thr Phe Ile His Ser Thr Thr Gly Pro Val Lys Glu Ile  
65                      70                      75                      80

Cys Arg Arg Ala Thr Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe  
85                      90                      95

Thr Leu Thr Thr Cys Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser  
100                      105                      110

Asn Thr Thr Asn Phe Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val  
115                      120                      125

His Phe Val Lys Thr Gly Lys Cys  
130                      135

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Met Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His  
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Ile Thr Ser Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn  
20                      25                      30

Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Val Asn Thr Phe  
35                      40                      45

Ile His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr  
50                      55                      60

Gly Arg Val Asn Lys Ser Ser Thr Gln Gln Phe Thr Leu Thr Thr Cys  
65                      70                      75                      80

Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe

85

90

95

Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr  
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Gly Lys Cys  
 115

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<400> 69

Met Lys Pro Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His  
 1 5 10 15

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 20 25 30

Asp Pro Ala Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe  
 35 40 45

Ile His Ser Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr  
 50 55 60

Gly Arg Val Asn Lys Ser Ser Cys Gln Gln Phe Thr Leu Thr Thr Cys  
 65 70 75 80

Lys Asn Pro Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe  
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Ile Cys Ile Thr Cys Arg Asp Asn Tyr Pro Val His Phe Val Lys Thr  
 100 105 110

Gly Lys Cys  
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Asn Ser Asp Ser Glu Cys Pro Leu Ser His Asp Gly Tyr Cys Leu His  
 1 5 10 15

Asp Gly Val Cys Met Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys Asn  
 20 25 30

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Cys Val Val Gly Tyr Ile Gly Glu Arg Cys Gln Tyr Arg Asp Leu Lys  
35 40 45

Trp Trp Glu Leu Arg Gly Gly Ser Gly Gly Pro Gly Gly Ser Lys Pro  
50 55 60

Lys Glu Asp Arg Glu Trp Glu Lys Phe Lys Thr Lys His Ile Thr Ser  
65 70 75 80

Gln Ser Val Ala Asp Phe Asn Cys Asn Arg Thr Met Asn Asp Pro Ala  
85 90 95

Tyr Thr Pro Asp Gly Gln Cys Lys Pro Ile Asn Thr Phe Ile His Ser  
100 105 110

Thr Thr Gly Pro Val Lys Glu Ile Cys Arg Arg Ala Thr Gly Arg Val  
115 120 125

Asn Lys Ser Ser Cys Gln Gln Phe Thr Leu Thr Thr Cys Lys Asn Pro  
130 135 140

Ile Arg Cys Lys Tyr Ser Gln Ser Asn Thr Thr Asn Phe Ile Cys Ile  
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cgttgccagt accgtgacct gaaatggtgg gaactgcgtg gtggttcttg tgggccgggt 180  
ggttctaaac cgaaagaaga ccgtgaatgg gaaaaattca aaactaaaca tatcacttct 240  
cagtctgttg ctgacttcaa ctgcaaccgt actatgaacg acccggtta cactccggac 300  
ggtcagtgca aaccgatcaa cactttcatc cattctacta ctgggtccggt taaagaaatc 360  
tgccgtcgtg ctactggtcg tgtaacaaa tcttcttgcc agcagttcac tctgactact 420  
tgcaaaaacc cgatccgttg caaatactct cagtctaaca ctactaactt catctgcatc 480  
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